

LISTING OF CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A semi-transmissive-type liquid crystal display device comprising:

a first substrate including a plurality of signal electrodes being arranged in parallel to one another along a first direction, a plurality of scanning electrodes being arranged in parallel to one another along a second direction orthogonal to said first direction and a plurality of pixel regions each having a pixel electrode being placed in a one-to-one correspondence to an intersection between each of said signal electrodes and each of said scanning electrodes;

a second substrate;

a liquid crystal layer inserted between said first substrate and said second substrate;

a backlight source to feed light to said liquid crystal layer; and

wherein each of said pixel regions includes a reflective region having a reflective film to receive ambient light from an outside and to display in a reflective manner while being in a reflective display mode, and a transmissive region having a transmissive electrode film to allow light from said backlight source to be transmitted to display in a transmissive manner at time of operations in a transmissive display mode, said transparent electrode film in the transmissive display mode serving as said pixel electrode and said reflective film in the reflective display mode serving as said pixel electrode; and

wherein in each of said pixel regions, said transparent electrode film is extended to said reflective film in a manner to cover at least one part of said reflective film, said first gap and said second gap being approximately equal when said twisted angle is about 72°.

2. (original) The semi-transmissive-type liquid crystal display device according to Claim 1, wherein said transparent electrode film is formed over said reflective film through an insulating film which is interposed between said transparent electrode film and said reflective film.
3. (original) The semi-transmissive-type liquid crystal display device according to Claim 1, wherein said transparent electrode film is formed directly on said reflective film.
4. (original) The semi-transmissive-type liquid crystal display device according to Claim 2, wherein said reflective film is electrically connected to said transparent electrode film through a contact hole formed in said insulating film.
5. (original) The semi-transmissive-type liquid crystal display device according to Claim 1, wherein in each of said pixel regions, a switching element to turn on or off a voltage signal to be applied to said liquid crystal layer is formed on a surface of said first substrate at a side facing said second substrate and said reflective film is formed in a manner to cover said switching element.
6. (original) The semi-transmissive-type liquid crystal display device according to Claim 5, wherein said reflective film covers said switching element with an insulating film having a concave and convex surface being interposed between said reflective film and said switching element.
7. (original) The semi-transmissive-type liquid crystal display device according to Claim 5, wherein a contact hole is formed in a manner so as to contact commonly with said insulating film and, in said contact hole, said reflective film and said transparent electrode film are electrically connected to an arbitrary electrode out of a plurality of electrodes making up said switching element.

8. (original) The semi-transmissive-type liquid crystal display device according to Claim 5, wherein a first contact hole and a second contact hole are formed in said insulating film and said reflective film is electrically connected to one electrode of said switching element through said first contact hole and said transparent electrode film is electrically connected to one electrode of said switching element through said second contact hole.

9. (original) The semi-transmissive-type liquid crystal display device according to Claim 5, wherein a G-D (Gate - Drain) converting portion to draw a signal line used to apply a voltage signal to said liquid crystal layer from a gate layer on said surface of said first substrate at said side of facing said second substrate outside of said transmissive region and said reflective region.

10. (original) The semi-transmissive-type liquid crystal display device according to Claim 1, wherein said reflective film is made of a conductive material containing Al (aluminum) or an Al alloy and said transparent electrode film is made of ITO (Indium Tin Oxide).

11. (previously presented) A semi-transmissive-type liquid crystal display device comprising:

a first substrate including a plurality of signal electrodes being arranged in parallel to one another along a first direction, a plurality of scanning electrodes being arranged in parallel to one another along a second direction orthogonal to said first direction and a plurality of pixel regions each having a pixel electrode being placed in a one-to-one correspondence to an intersection between each of said signal electrodes and each of said scanning electrodes;

a second substrate;

a liquid crystal layer inserted between said first substrate and said second substrate;

a backlight source to feed light to said liquid crystal layer; and

wherein each of said pixel regions includes a reflective region having a reflective film to receive ambient light from an outside and to display in a reflective manner while being in a reflective display mode, and a transmissive region having a transmissive electrode film to allow light from said backlight source to be transmitted to display in a transmissive manner at time of operations in a transmissive display mode, said transparent electrode film in the transmissive display mode serving as said pixel electrode and said reflective film in the reflective display mode serving as said pixel electrode; and

wherein in each of said pixel regions, a first gap between said first substrate and said second substrate in said reflective region and a second gap between said first substrate and said second substrate in said transmissive region are calibrated so that reflectance or transmittance in white display is maximized according to a twisted angle of said liquid crystal layer.

12. (original) The semi-transmissive-type liquid crystal display device according to Claim 11, wherein, when a twisted angle of said liquid crystal is set to about 72° , a calibration is so done that said first gap in said reflective region becomes equal approximately to said second gap in said transmissive region.

13. (original) The semi-transmissive-type liquid crystal display device according to Claim 11, wherein, when a twisted angle of said liquid crystal is set to about 0° , a calibration is so done that said first gap in said reflective region is approximately a half of said second gap in said transmissive region.

14. (original) The semi-transmissive-type liquid crystal display device according to Claim 11, wherein, when a twisted angle of said liquid crystal is set to about 60° , a calibration is so done that said first gap in said reflective region accounts for approximately 70% of said second gap in said transmissive region.

15. (withdrawn) A method for manufacturing a semi-transmissive-type liquid crystal display device comprising a first substrate including a plurality of signal electrodes being arranged in parallel to one another along a first direction; a second substrate including a plurality of scanning electrodes being arranged in parallel to one another along a second direction orthogonal to said first direction and a plurality of pixel regions each being placed in a one-to-one correspondence to an intersection between each of said signal electrodes and each of said scanning electrodes; a liquid crystal layer inserted between said first substrate and said second substrate; a backlight source to feed light to said liquid crystal layer; and wherein each of said pixel regions includes a reflective region having a reflective film to receive ambient light from an outside and to display in a reflective manner while being in a reflective display mode, and a transmissive region having a transmissive electrode film to allow light from said backlight source to be transmitted to display in a transmissive manner at time of operations in a transmissive display mode, said method comprising:

a first process of forming said reflective film making up said reflective region on a surface of said first substrate facing said second substrate; and

a second process of forming said transparent electrode film making up said transmissive region in a manner that said transparent electrode film covers part or all of said reflective film.

16. (withdrawn) The method for manufacturing a semi-transmissive-type liquid crystal display device according to Claim 15, comprising a third process of forming an insulating film on said reflective film to be performed between said first process and said second process.

17. (withdrawn) The method for manufacturing a semi-transmissive-type liquid crystal display device according to Claim 16, further comprising a fourth process of forming a contact hole to electrically connect said reflective film and said transparent electrode film in said insulating film.

18. (withdrawn) A method for manufacturing a semi-transmissive-type liquid crystal display device comprising a first substrate including a plurality of signal electrodes being arranged in parallel to one another along a first direction; a second substrate including a plurality of scanning electrodes being arranged in parallel to one another along a second direction orthogonal to said first direction and a plurality of pixel regions each being placed in a one-to-one correspondence to an intersection between each of said signal electrodes and each of said scanning electrodes; a liquid crystal layer inserted between said first substrate and said second substrate; a backlight source to feed light to said liquid crystal layer; and wherein each of said pixel regions includes a reflective region having a reflective film to receive ambient light from an outside and to display in a reflective manner while being in a reflective display mode, and a transmissive region having a transmissive electrode film to allow light from said backlight source to be transmitted to display in a transmissive manner at time of operations in a transmissive display mode, said method comprising:

a process of performing a calibration on a first gap between said first substrate and said second substrate in said reflective region and a second gap between said first substrate and said second substrate in said transmissive region so that reflectance or transmittance in white display is maximized according to a twisted angle of said liquid crystal layer by inserting said liquid crystal layer between said first substrate and said second substrate,

wherein said first substrate is formed by processes of forming said reflective film making up said reflective region on a surface of said first substrate facing said second substrate and of forming said transparent electrode film making up said transmissive region in a manner that said transparent electrode film covers part or all of said reflective film.

19. (withdrawn) The method for manufacturing a semi-transmissive-type liquid crystal display device according to Claim 18, wherein a calibration is performed on said first gap between said first substrate and said second substrate in said reflective region and said second gap between said first substrate and said second substrate in said transmissive region so that reflectance or transmittance in white display is maximized according to a twisted angle of said liquid crystal layer by forming said reflective film on a surface of said first substrate facing said second substrate through an insulating film having a concave and convex surface being interposed between said reflective film and said second substrate.

20. (withdrawn) The method for manufacturing a semi-transmissive-type liquid crystal display device according to Claim 18, wherein a calibration is performed on said first gap between said first substrate and said second substrate in said reflective region and said second gap between said first substrate and said second substrate in said transmissive region so that reflectance or transmittance in white display is maximized according to a twisted angle of said liquid crystal layer by processing a surface of said first substrate facing said second substrate.

21. (withdrawn) The method for manufacturing a semi-transmissive-type liquid crystal display device according to Claim 19, wherein a thickness of said insulating film is made different between said transmissive region and said reflective region.

22. (new) A semi-transmissive-type liquid crystal display device comprising:

a first substrate including a plurality of signal electrodes arranged in parallel to one another along a first direction, a plurality of scanning electrodes arranged in parallel to one another along a second direction orthogonal to said first direction and a plurality of pixel regions each having a pixel electrode being placed in a one-to-one correspondence to an intersection between each of said signal electrodes and each of said scanning electrodes, each of said pixel regions comprising:

a reflective region having a reflective film to receive ambient light from an outside and to display in a reflective manner while being in a reflective display mode, said reflective film in the reflective display mode serving as said pixel electrode each of said pixel regions; and

a transmissive region having a transmissive electrode film to allow light from said backlight source to be transmitted to display in a transmissive manner at time of operations in a transmissive display mode, said transparent electrode film in the transmissive display mode serving as said pixel electrode, said transparent electrode film is extended to said reflective film in a manner to cover at least one part of said reflective film, each of said pixel regions having a first gap between said first substrate and said second substrate in said reflective region and a second gap between said first substrate and said second substrate in said transmissive region are dimensioned to provide a predefined reflectance or transmittance white display based on a twisted angle of said liquid crystal layer, said first gap being approximately half of said second gap when said twisted angle is about 0°;

a second substrate;

a liquid crystal layer inserted between said first substrate and said second substrate; and
a backlight source to feed light to said liquid crystal layer.

23. (new) A semi-transmissive-type liquid crystal display device comprising:

a first substrate including a plurality of signal electrodes arranged in parallel to one another along a first direction, a plurality of scanning electrodes arranged in parallel to one another along a second direction orthogonal to said first direction and a plurality of pixel regions each having a pixel electrode being placed in a one-to-one correspondence to an intersection between each of said signal electrodes and each of said scanning electrodes, each of said pixel regions comprising:

a reflective region having a reflective film to receive ambient light from an outside and to display in a reflective manner while being in a reflective display mode, said reflective film in the reflective display mode serving as said pixel electrode each of said pixel regions; and

a transmissive region having a transmissive electrode film to allow light from said backlight source to be transmitted to display in a transmissive manner at time of operations in a transmissive display mode, said transparent electrode film in the transmissive display mode serving as said pixel electrode, said transparent electrode film is extended to said reflective film in a manner to cover at least one part of said reflective film, each of said pixel regions having a first gap between said first substrate and said second substrate in said reflective region and a second gap between said first substrate and said second substrate in said transmissive region are dimensioned to provide a predefined reflectance or transmittance white display based on a twisted angle of said

liquid crystal layer, said first gap being approximately 70% of said second gap when said twisted angle is about 60°;
a second substrate;
a liquid crystal layer inserted between said first substrate and said second substrate; and
a backlight source to feed light to said liquid crystal layer.